

Updated Checklist of Wisconsin Centipedes (Chilopoda)

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In 1958, Cloudsley-Thompson wrote "the biology of centipedes has attracted comparatively little attention from zoologists." The situation remains much the same today, with only a few individuals currently studying centipedes. While modern checklists exist for some surrounding states (e.g., Illinois: Summers, et al. 1980; Michigan: Snider 1991), no comprehensive report for Wisconsin is currently available. Matthews surveyed the centipedes of Wisconsin for his Ph.D. thesis (1935), but never published his work. Other important collections of Wisconsin centipedes were made by Chamberlin (1911, 1912a) and Crabill (1958). Here, I retrieve information from these works and compliment it with records from the Milwaukee Public Museum (MPM) invertebrate zoology collection, personal collections and observations, and a more thorough literature review.

The taxonomic system of Lewis (1981) is used for families and suprafamilial taxa. Species are listed alphabetically under each family, and synonymies are restricted to citing species names used by others working on the Wisconsin fauna. County records are presented in alphabetical order for each species. Literature records are indicated by author and publication year. General records from the state are omitted when more specific information is available (e.g., Kevan's [1983] records from "Wisconsin" are generally omitted). Museum records are followed by "MPM" and the year of collection. Neither Chamberlin (1911, 1912a), Matthews (1935) nor Crabill (1958) indicated the deposition of specimens they examined. I have been unable to relocate Matthews' (1935) specimens at the University of Wisconsin. Chamberlin's (1911, 1912a) and Crabill's (1958) specimens are presumably at the Museum of Comparative Zoology. I hope to locate and examine these collections at some future time. Specimens from my own field work were deposited in the MPM collection and are included in the county record lists as MPM records. Personal observations are noted. Species in boldface type are newly reported from the state. General comments on distribution and ecology precede county records for most species. Thirty-five species, in four orders and nine families, are documented. This compares favorably with the 27 species reported from Michigan (Snider 1991) and the 45 species known from Illinois (Summers, et al. 1980). This report, however, must be understood as provisional and incomplete. It is intended as a baseline inventory synthesizing and summarizing existing knowledge.

Diagnostic features for each order are briefly summarized. For more detailed information on the biology and classification of centipedes, readers are referred to Cloudsley-Thompson (1958), Lewis (1981), Mundel (1991), and works cited therein. The works by Kevan and Scudder (1989) and Mundel (1991) include keys to centipede orders and families. A regional key for identification to the species level is provided by Summers (1979).

Despite their abundance and frequent occurrence, centipedes are not at all well studied and thus present many opportunities for various investigations (Mundel 1991). As organisms, they are fascinating creatures! It is hoped that this checklist will stimulate further interest in their study.

COLLECTION AND PRESERVATION: Most of the smaller centipedes can be collected by hand; their bites cannot pierce the skin. The larger species, particularly the scolopendromorphs, should be grasped by forceps close behind the head so that the animal cannot flex the anterior and strike the collector. Some of the most important details used in lithobiomorph classification occur on the last legs of males, which are readily broken by handling during capture (Hoffman 1995). Lithobiomorphs should be grabbed by the anterior end, the smaller species with moistened finger tips. Specimens taken in pitfalls or with Berlese funnel extraction are generally the most complete and usable (Hoffman 1995). An aspirator can also be used to collect small, fragile specimens.

Use of ethyl alcohol for fixing and preserving centipedes should be avoided! Ethyl alcohol makes specimens hard and brittle and causes them to die in contorted positions, making material very difficult to work with (Mundel 1991, pers. obs.). Crabill and Lorenzo (1955) found that long-term storage in formalin resulted in many details of sculpturing, pilosity, and proportion being obliterated or distorted. Seventy percent isopropyl alcohol with 1-3 percent glacial acetic acid works well for fixing specimens; 70 percent isopropyl alcohol is best for permanent storage.

Centipedes seem to exert a weird fascination on the morbid appetites of the hysterical and insane.

- A.R. Jackson, in *Lanc. Natur.*, 1914

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CHECKLIST AND CATALOG OF RECORDS

Class Chilopoda

Subclass Epimorpha

In the subclass Epimorpha, young have fewer legs than adults. The adult complement is achieved after a series of molts. The subclass includes two orders: Scolopendromorpha and Geophilomorpha. Epimorpha lay their eggs in clusters. Brooding behavior, in which females remain curled around the eggs until they have hatched and the young have molted several times, has been observed in both orders (Lewis 1981).

Order Scolopendromorpha

The Scolopendromorpha are the largest of all centipedes. They have 21 or 23 pedal segments, depending on the genus.

The larger, more frequently encountered forms tend to be active predators, taking a large variety of prey; they will also in many cases scavenge (Lewis 1981, Mundel 1991).

Family Cryptopidae

Scolopocryptops rubiginosa Koch 1878
Dinocryptops rubiginosa Koch 1878: Crabill 1960

Kevan (1983) believed that *S. rubiginosa* could be a western and central North American and northeast Asian subspecies of *S. sexspinosus*, and that there has been some confusion in the records as a result. At this time, I have no evidence to support subspecific status for *rubiginosa* and have therefore retained the name.

Summers, et al. (1980) reported *S. rubiginosa* from several natural divisions in Illinois, and it is known from Minnesota (Crabill 1958).

Sauk: Crabill 1958
Grant: Crabill 1958

Scolopocryptops sexspinosus (Say 1821)

Matthews (1935) did not believe *S. sexspinosus* to be common in Wisconsin, but Bollman (1893) found it common just across the state border in Minnesota. This species may be expected to occur in southeast Wisconsin, since Summers, et al. (1980) found it in northeast Illinois.

This is the largest centipede in the region. Adults may obtain lengths of nearly 60 mm, but Wisconsin specimens do not exceed 40 mm. *S. sexspinosus* lives in the soil and includes earthworms in its diet (Williams and Hefner 1928). All Matthews' (1935) specimens were collected under stones, and he suggested it prefers a slightly more arid habitat than lithobiids and geophilids do. Summers and Uetz (1979) characterized *S. sexspinosus* as a litter species in Illinois.

Matthews (1935) called *S. sexspinosus* the most pugnacious of any species collected in Wisconsin, and

noted that it takes more of an offensive than defensive attitude attempting again and again to bite.

S. sexspinosus is probably more common than the following records imply.

Dane: Matthews 1935, pers. obs.
Grant: Matthews 1935
LaCrosse: Matthews 1935, pers. obs.

Order Geophilomorpha

The Geophilomorpha, which are sometimes referred to as soil centipedes, are slender, eyeless centipedes with 14-segmented antennae and 31-181 pairs of legs (the number is always odd and varies within species). Both familial and generic distinctions are drawn heavily from details of the mouthparts.

Most geophilomorphs are less than 50 mm in length. They feed on small insects, insect larvae, and worms (Lewis 1981, Levi and Levi 1987)

Family Schendylidae

Escaryus urbicus (Meinert 1886)

Escaryus urbicus shows a tolerance for cold and exhibits a fragmented distribution in the eastern United States (Massachusetts, New York, montane Virginia, Ohio, Minnesota, and Wisconsin) (Crabill 1958). Kevan (1983) reported an unidentified *Escaryus* from Wisconsin, presuming it was this species.

Milwaukee: MPM 1978
Sauk: Crabill 1958

Schendyla nemorensis (Koch 1836)

Schendyla nemorensis is common in western Europe and known to be widespread in the United States east of the Mississippi River. Similar to *Escaryus urbicus*, it shows a remarkable tolerance for cold (Crabill 1958). It is generally found in leaf litter and under stones. Williams and Hefner (1928) found that *S. nemorensis* remains deep (152 mm - 304 mm) in the soil in hot weather and could be easily overlooked in summer collecting.

S. nemorensis can be expected from several additional southern Wisconsin counties. Summers, et al. (1980) reported it in several areas in Illinois. It also likely occurs in northern counties, since it has been collected in Gogebic County in Michigan's Upper Peninsula (Johnson 1952).

Dane: Crabill 1958
Ozaukee: MPM 1978

*A centipede was happy quite
Until a toad in fun
Said, "Pray which leg moves after which?"
This raised her doubts to such a pitch,
She fell exhausted in the ditch,
Not knowing how to run.*

Family Geophilidae

Arenophilus bipuncticeps (Wood 1862)

Geophilus bipuncticeps Wood 1862; Matthews 1935

The peculiar tendency of *Arenophilus bipuncticeps* to retreat backwards when disturbed has proved a good field characteristic (Crabill 1958). Matthews (1935) believed this species to be abundant throughout the state. *A. bipuncticeps* lives under dung, stones, and pieces of wood, and is often found in the loose soils of gardens. It appears to be able to withstand dry weather better than most species, and seems to be found as equally abundant after a long dry spell as when the ground is moist (Gunthorp 1913).

Dane: Matthews 1935, Crabill 1958

Pierce: Matthews 1935

Polk: Matthews 1935

Rock: Chamberlin 1912a

Sawyer: Matthews 1935

Vilas: Matthews 1935

Geophilus oweni Bollman 1887

Matthews (1935) is the only one to report *Geophilus oweni* from Wisconsin. He collected four specimens in the Madison area (Dane County) that he believed to be *G. oweni*. Crabill (1954) stated that this species was known only from Indiana, Ohio, and Missouri. Further work is needed to determine if *G. oweni* occurs in Wisconsin.

Geophilus vittatus (Rafinesque 1820)

Geophilus rubens Say 1821; Matthews 1935, Chamberlin 1944

Geophilus vittatus is more abundant and more widely dispersed than any other native geophilomorph. It is probably the most ubiquitous and commonly-encountered centipede in North America east of the Rocky Mountains (Crabill 1958). *G. vittatus* is typically found under tree bark and less commonly under stones and debris on the ground (Crabill 1958). In Virginia, for example, Hoffman (1995) found it most often under the loose bark flakes of *Pinus taeda*.

Crawford: Matthews 1935

Dane: Matthews 1935, Crabill 1958

Door: pers. obs.

Grant: Matthews 1935, Crabill 1958

Iowa: Crabill 1958

Langlade: Matthews 1935, Chamberlin 1944,
Crabill 1954

Milwaukee: MPM 1908

Monroe: Crabill 1958

Pierce: Matthews 1935

Sauk: Crabill 1958

Vernon: Crabill 1958

Walworth: Chamberlin 1944; Crabill 1954, 1958

Waupaca: Crabill 1958

Soniphilus embius Chamberlin 1912

Soniphilus embius was described by Chamberlin (1912a) based on a female specimen collected in Iowa. Keven's (1983) general report from Wisconsin is the only record from the state that I am aware of.

Family Chilenophilidae

Pachymerium ferrugineum (Koch 1835)

Pachymerium ferrugineum is an Holarctic species, but Kevan (1983) believed it to be introduced where it occurs in eastern North America.

At Fond du Lac, *P. ferrugineum* was found in great abundance among the stones at a river's edge, partly grown individuals being common, and a considerable number of females being found with bodies still coiled about their recently hatched young (Chamberlin 1912). These observations are similar to those of Hoffman (1995) who reported that Virginia records were all from "natural" habitats, usually under stones in low, wet places.

P. ferrugineum might be expected in southeastern and northern Wisconsin, since Summers, et al. (1980) reported it in northeast Illinois and Snider (1991) found it throughout Michigan's Upper Peninsula.

Fond du Lac: Chamberlin 1912a

Sauk: Chamberlin 1912a

Taiyuna opita Chamberlin 1912

Snider (1991) collected numerous specimens of this species from the litter and A horizon in maple-basswood forests in Michigan. He found *Taiyuna opita* present May through October and believed it to be "probably common in mesic forests."

Buffalo: Crabill 1958

Columbia: Crabill 1958

Dane: Crabill 1958

Forest: MPM 1995

Grant: Crabill 1958

Iowa: Crabill 1958

Sauk: Crabill 1958

Family Dignathodontidae

Strigamia acuminata (Leach)

Kevan (1983) is the only one to report the European *Strigamia acuminata* from Wisconsin. He suggested some Wisconsin records of *S. chionophila* were this species. Chamberlin (1912a) also stated that there is a close relationship between *S. chionophila* and *S. acuminata* and believed the two might have to be merged. The presence of *S. acuminata* as a distinct species in Wisconsin remains questionable.

In Siam, centipedes are roasted and given to children suffering from "thinness and swollen belly," and roasted centipedes powdered and soaked in alcohol and the juice of borapet are used medicinally as a stimulant.
- J.L. Cloudsley-Thompson, 1958

Strigamia bothriopa Wood 1863
Linotenia fulva Sager 1856: Matthews 1935

One of the more common geophilomorph species, *Strigamia bothriopa* is nearly as common as *Geophilus vittatus* in Wisconsin (Crabill 1958). It is a crimson colored centipede found almost always under stones and debris, and quite often in leaf litter (Crabill 1958).

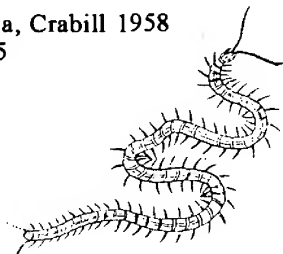
Crawford: Crabill 1958
Dane: Matthews 1935, Crabill 1958
Door: MPM 1992
Grant: Crabill 1958
Jackson: Crabill 1958
Milwaukee: MPM 1980
Pierce: Matthews 1935
Sauk: Crabill 1958
Vernon: Crabill 1958

Strigamia chionophila (Wood 1863)
Linotenia chinophila Wood 1863: Chamberlin 1912a, Matthews 1935

Strigamia chionophila is a boreal species, being found as far north as Alaska and adjacent islands (Chamberlin 1912a). It is generally found in leaf litter (Crabill 1958), but Chamberlin (1912a) also found it under stones around Devil's Lake. *S. chionophila* has been reported from several counties in the Upper Peninsula of Michigan (Johnson 1952, Snider 1991).

This species is easily confused with *Strigamia branneri* and many previous reports of *chionophila* have probably been based upon incorrect identifications (Summers, et al. 1980).

Ashland: Chamberlin 1912a
Bayfield, Madeline Island: Matthews 1935
Clark: Crabill 1958
Crawford: Crabill 1958
Dane: Matthews 1935, Crabill 1958
Douglas: Matthews 1935
Grant: Matthews 1935, Crabill 1958
Iowa: Crabill 1958
LaCrosse: Matthews 1935, Crabill 1958
Pierce: Matthews 1935
Sauk: Chamberlin 1912a, Crabill 1958
Sawyer: Matthews 1935
Vernon: Crabill 1958
Vilas: Matthews 1935
Walworth: MPM 1980



Subclass Anamorpha

Unlike the Epimorpha, the young of members of this class are born with the full adult complement of legs. Anamorpha includes two orders: Lithobiomorpha and Scutigleromorpha. These orders also differ from the Epimorpha in that their eggs are laid singly rather than in a single clutch (Lewis 1981). Brooding behavior has not been observed in the Anamorpha.

Order Lithobiomorpha

The Lithobiomorpha, or stone centipedes, have 18 body segments and 15 pairs of legs. There are 20-50 (or more) segments in the antennae.

Lithobiomorpha is the most diverse order of centipedes in the north temperate region (Summers 1979). Unfortunately, many early records were lumped under rubric such as "*Lithobius* sp." or "lithobiomorph" (e.g., see Cahn's 1915 record from Dane County). Many of the smaller species (especially those < 10 mm in length) are often overlooked by collectors. Extraction of litter samples with a Berlese apparatus is often more effective than hand-picking and yields specimens in far better condition (Hoffman 1995).

Lithobiomorphs feed on a variety of small arthropods, annelids, and slugs (Lewis 1981).

Family Lithobiidae

Lithobius celer Bollman 1888

Lithobius celer is known from the southern U.S., and Kevan (1983) suggested that northern records of this species might refer merely to a form of *L. forficatus* or some other species. Chamberlin (1911) provisionally reported *L. celer* from an unspecified Wisconsin locality. Watermolen (1996) reported an additional specimen collected in Dane County. *L. celer* is probably not established in Wisconsin. Its occurrence here is likely the result of human introductions.

Lithobius forficatus (Linnaeus 1758)

Lithobius forficatus has been introduced from Europe repeatedly. It is rarely found at any great distance from places of human activity (Crabill 1958). This species is "exceedingly abundant" throughout Wisconsin (Chamberlin 1911, 1925) and is the most common centipede in the northern U.S.

Ashland: Chamberlin 1911
Barron: Chamberlin 1911, 1925; Matthews 1935
Bayfield: Matthews 1935
Bayfield, Madeline Island: Matthews 1935
Brown: pers. obs.
Buffalo: Crabill 1958
Dane: Matthews 1935, Crabill 1958
Door: Matthews 1935, MPM 1992
Douglas: Matthews 1935
Eau Claire: Chamberlin 1911, 1925
Fond du Lac: Chamberlin 1911, 1925
Forest: MPM 1996
Iowa: Matthews 1935
Iron: Chamberlin 1911, 1925
LaCrosse: Matthews 1935
Marinette: Chamberlin 1911, 1925
Milwaukee: MPM 1908, 1976, 1977, 1979, 1980
Ozaukee: MPM 1978, 1979, 1987, 1988, 1989
Pierce: Matthews 1935
Rock: Chamberlin 1911, 1925
Sauk: Chamberlin 1911, 1925; Matthews 1935
Sawyer: Matthews 1935
Sheboygan: Crabill 1958

Lithobius forficatus, cont.

Vilas: Matthews 1935
Washington: MPM 1979, 1980
Waukesha: MPM 1977, 1979
Waupaca: Crabill 1958
Winnebago: MPM 1955

Lithobius melanops Newport

Taiyubius harrietae (Chamberlin 1909): Crabill 1958

Lithobius melanops is a common European centipede that has been introduced to North America. Eason (1977) suggested that an analysis of its habitat would show that *L. melanops* is essentially synanthropic. Believing it to be a different species, Crabill (1958) hypothesized that the paucity of records for *L. melanops* was due to the species' dependence on narrowly restrictive environmental conditions. He found it on non-sandy soils in a very cool, damp ravine. It is more likely that *L. melanops* has not been able to establish itself in native habitats in significant numbers. Crabill's (1958) record from Dane County is the only one available for the state.

Nadabius holzingeri (Bollman 1887)

Nadabius iowensis (Meinert 1886): Matthews 1935, in part

Matthews (1935) treated *Nadabius holzingeri* as a synonym of *N. iowensis*, and Crabill (1958) believed that future research would show *holzingeri* to be a variant of *iowensis*. Summers (1979) and Summers, et al. (1980), however, treated *N. holzingeri* as a distinct species. I retain the name in the absence of definitive evidence supporting a synonymy. As a result, one of Matthews' (1935) records reported below for *N. iowensis* may actually apply to this species.

This species has been reported from southeastern Minnesota, Wisconsin, and Indiana (Crabill 1958), as well as from Illinois (Summers, et al. 1980).

Columbia: Crabill 1958
Grant: Crabill 1958
Iowa: Crabill 1958
Jackson: Crabill 1958
Sauk: Chamberlin 1911, Crabill 1958

Nadabius iowensis (Meinert 1886)

Lithobius jowensis Meinert 1886: Chamberlin 1911
Lithobius minnesotae Bollman 1887: Chamberlin 1911
Nadabius eigenmanni (Bollman 1887): Matthews 1935

Nadabius iowensis occurs throughout Illinois (Summers, et al. 1980) and Michigan (Snider 1991). Snider (1991) collected numerous specimens in the litter and A horizon in maple-basswood forests in May through October. He also collected them in pitfall traps. *N. iowensis* appears to overwinter in the nests of mound-building ants (Holmquist 1928, Auerbach 1951b). An immature *Nadabius* specimen collected in September 1987 from a compost heap at the University of Wisconsin-Milwaukee Field Station in Ozaukee County also appears to be an *iowensis*.

Barron: Chamberlin 1911, 1922; Matthews 1935
Bayfield, Madeline Island: Matthews 1935

N. iowensis, cont.

Buffalo: Crabill 1958
Clark: Crabill 1958
Dane: Crabill 1958 (Matthews [1935] also mapped a record from Dane County, but did not include it in his narrative statistics)
Grant: Matthews 1935, Crabill 1958
Iowa: Matthews 1935, Crabill 1958
LaCrosse: Matthews 1935
Marinette: Chamberlin 1911, 1922
Pierce: Matthews 1935
Polk: Matthews 1935
Portage: Crabill 1958
Rock: Chamberlin 1911, 1922
Sauk: Matthews 1935, Crabill 1958
Sawyer: Matthews 1935
Vernon: Crabill 1958
Vilas: Matthews 1935

Nampabius sp. Chamberlin 1913

The genus *Nampabius* is a group of small lithobiomorphs characterized by having the first tergite much narrower than the head. Two specimens have been collected in southeast Wisconsin. One was collected from under a log; the other was taken in a soil sample. Both are missing antennae and appendages making specific determinations impossible. Based on the shape of the prosternal diastema, they are likely *Nampabius virginensis* (Chamberlin 1913). The prosternal diastema is U-shaped in this species (Crabill 1952). These records represent the northwestern most locality and a significant range extension for this genus (see Summers, et al 1980 and Mundel 1981).

Milwaukee: MPM 1978
Washington: MPM 1980

Neolithobius mordax (Koch 1862)

Lithobius mordax Koch 1862: Chamberlin 1911

Chamberlin (1911) reported collecting a young male specimen, which he thought probably to be *Neolithobius mordax*, from an unspecified Wisconsin locality. Kevan's (1983) "Wisconsin" record appears to be based on this report.

Chamberlin (1925) reported *N. mordax* from Fort Snelling and Winona, Minnesota, but Snider (1991) did not report it from Michigan and Summers, et al. (1980) discussed problems with the only four specimens available from Illinois. Its presence in Wisconsin remains questionable.

Neolithobius voracior (Chamberlin 1912)

Auerbach (1951b) and Summers, et al. (1980) found *Neolithobius voracior* in the Chicago area. This species occurs in leaf mold in the spring, moving into logs or deep into the soil in summer and winter (Auerbach 1951b). There is one record of *N. voracior* from Waukesha county (MPM 1976).



Paitobius exiguus (Meinert 1886)
Lithobius exiguus Meinert 1886: Chamberlin 1911

Chamberlin's (1911) Rock County record of *Paitobius exiguus* is the only one available for the state. Field work in southern Wisconsin might yield further records.

***Paitobius juvenus* (Bollman 1887)**

Paitobius juvenus is known from northwestern Illinois and the Chicago area (Summers, et al. 1980), and probably occurs in southern Wisconsin. I collected it in Wisconsin for the first time in 1992.

Door: MPM 1992

*Pokabius bilabiatu*s (Wood 1867)
*Lithobius bilabiatu*s Wood 1887: Chamberlin 1911

The Southwest is considered the center of origin for the genus *Pokabius* (Chamberlin 1922). *P. bilabiatu*s probably occurs throughout Wisconsin. Summers, et al. (1980) reported it from throughout Illinois, Snider (1991) from lower Michigan, and Bollman (1893) from eastern Minnesota. *P. bilabiatu*s appears to overwinter in the nests of mound-building ants (Holmquist 1928).

Dane: Matthews 1935
Grant: Matthews 1935
Iowa: Matthews 1935
Milwaukee: MPM 1992
Sauk: Chamberlin 1911, 1922; Matthews 1935
Sawyer: Matthews 1935

***Sonibius* spp. Chamberlin 1912**

Matthews (1935) collected six specimens of *Sonibius*: two of which he assigned to *S. politus* and four which were identified as *S. numius*. In mapping the distribution of these specimens, he did not indicate which localities were specific to each species.

Grant: Matthews 1935
Pierce: Matthews 1935
Polk: Matthews 1935
Sawyer: Matthews 1935

Sonibius numius (Chamberlin 1911)
Lithobius numius Chamberlin 1911: Chamberlin 1911

Chamberlin (1911) first described this species based on specimens collected in Barron County. Matthews (1935) collected four specimens from unidentified Wisconsin localities (see *Sonibius* spp.). Further evaluation of this species may show it to be a synonym of *S. politus*.

***Sonibius politus* (McNeill 1887)**

As indicated above, Matthews (1935) collected two *Sonibius politus* specimens at unidentified Wisconsin localities (see *Sonibius* spp.). Snider (1991) found *S. politus* in woody debris and leaf litter in a maple-basswood forest during the months of May through

October in Dickinson County, Michigan. Summers, et al. (1980) reported this species from several places in Illinois. Further work is needed to define its Wisconsin distribution.

***Sozibius* sp. Chamberlin 1922**

The only specimen of *Sozibius* taken from Wisconsin was a male in poor condition collected in Dane County by Crabill (1958). I have not had an opportunity to examine Crabill's specimen, but it is likely *Sozibius proridens* (Bollman 1887) which occurs elsewhere in the Upper Midwest.

***Tidabius* sp. Chamberlin 1913**

The single specimen collected by Crabill (1958) in Dane County was in poor condition and probably represents either *Tidabius tivius*, which Chamberlin (1913) reported from Janesville, or *T. opiphilus*, known only from the type locality at Beloit.

***Tidabius opiphilus* Chamberlin 1913**

Chamberlin (1913) described *Tidabius opiphilus* based on specimens collected in Rock County. It has not been collected in Wisconsin since. Although he seemed to place taxonomic importance on structural characteristics of the female gonopod, Chamberlin (1913) provided no illustration of it (his paper includes references to a figure and a figure caption, but no actual figure). A careful comparison of his written diagnoses and descriptions suggests that *T. opiphilus* might be a synonym of *T. tivius*.

***Tidabius tivius* (Chamberlin 1909)**

Tidabius tivius probably occurs elsewhere in Wisconsin, particularly in the southern part of the state. Summers, et al. (1980) reported it from Illinois.

Milwaukee: MPM 1978
Rock: Chamberlin 1913

Family Ethopodidae

***Bothropolys multidentatus* (Newport 1845)**

Bothropolys multidentatus is one of the most abundant and widespread North American lithobiomorph centipedes (Chamberlin 1911). This dendrophilous species is occasionally collected in leaf litter (Crabill 1958), but is particularly common under tree bark (Crabill 1955). It probably occurs in suitable habitats in northern and southern Wisconsin and is certainly more common in the state than the two records below suggest. Snider (1991) found it in Mackinac County, Michigan and Summers, et al. (1980) reported it throughout Illinois.

Crawford: Crabill 1958
Door: Matthews 1935

Family Henicopidae

Lamyctes fulvicornis Meinert 1868

In the eastern United States this species seems almost limited to sites in or near cities and towns, which is in accord with the virtual certainty that it has been introduced repeatedly into this country from Europe and elsewhere (Crabill 1958). It is generally considered widespread and is also recorded from Canada (Kevan 1983). *L. fulvicornis* is found quite commonly on fairly moist, sandy soils, especially close to waterways (Crabill 1958). It can be expected from additional northern counties, the Fox River Valley, the Oshkosh area, and southeastern Wisconsin. It has been collected in Menominee and Gogebic Counties, Michigan (Snider 1991).

Ashland: Chamberlin 1911, 1912b
Barron: Chamberlin 1911, 1912b
Dane: Crabill 1958
Dodge: MPM 1980
Eau Claire: Chamberlin 1911, 1912b
Marinette: Chamberlin 1911, 1912b
Milwaukee: MPM 1978
Rock: Chamberlin 1911, 1912b
Waukesha: MPM 1976, 1977

Lamyctes pius Chamberlin 1911

Matthews (1935) is the only one to have reported *Lamyctes pius* from the state. He collected specimens in March 1933 and March 1935 close to a small Dane County stream, under dead leaves from which the snow had not yet melted. Outside of Wisconsin, this species is found in the Atlantic coastal states from North Carolina to Pennsylvania.

Order Scutigeromorpha

Unlike other centipedes, Scutigeromorpha have round heads and large compound eyes. Adults have 15 pairs of legs. The antennae are longer than the body and are composed of a large number of segments. Scutigero-morphs feed on flies and other insects (Levi and Levi 1987), slugs (pers. obs.), and spiders (Lewis 1981).

Family Scutigeridae

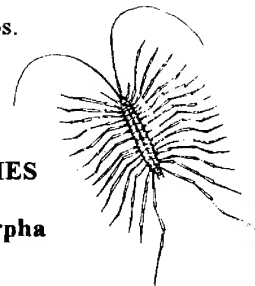
Scutigera coleoptrata (Linnaeus 1758)

This is the "house centipede" found throughout the eastern United States and Canada. It is rarely found outdoors in temperate regions, but it may occasionally be found in areas near human habitation (Snider 1980, Lee 1980). All of the specimens I have examined from Wisconsin were collected indoors. *S. coleoptrata* is certainly more widespread than the records listed below indicate and probably occurs statewide.

Brown: pers. obs.
Columbia: Crabill 1958
Dane: Matthews 1935, Crabill 1958, MPM 1996

S. coleoptrata, cont.

Door: pers. obs.
LaCrosse: pers. obs.
Milwaukee: MPM 1914, 1917, 1956, 1976, 1977,
1979, 1981, 1985
Waukesha: MPM 1992
Winnebago: MPM 1965, per. obs.



POTENTIAL WISCONSIN SPECIES

Order Geophilomorpha

Dignathodontidae

Strigamia branneri (Bollman 1888)

Strigamia branneri was reported by Summers, et al. (1980) from several northern Illinois counties, and Snider (1991) found it common in litter and soil in Dickinson County, Michigan. *S. branneri* may be expected to occur in Wisconsin. Some records of *S. chionophila* may refer to this species.

Order Lithobiomorpha

Lithobiidae

Nadabius ameles Chamberlin 1944

Nadabius pullus (Bollman 1887)

Neolithobius tyrannus (Bollman 1887)

These three lithobiomorphs are relatively small (< 20 mm in length) and are probably under-represented in museum collections and field activities. Based on what is known about their geographic distribution and habitat requirements, they likely occur in Wisconsin.

Sigibius sp. Chamberlin 1913

Mundel's (1981) map depicting the distribution of eastern North American lithobiomorphs shows the genus *Sigibius* as occurring in southeastern Wisconsin, but I know of no records for any *Sigibius* species from the state. I assume Mundel's (1981) map was intended to encompass the range of *Sigibius urbanus* Chamberlin 1944, the only record for which is the type specimen (a female specimen from Chicago). Further work is needed to determine if *Sigibius* is represented here, as well as in northeastern Illinois.

Taiyubius sp. Chamberlin 1912

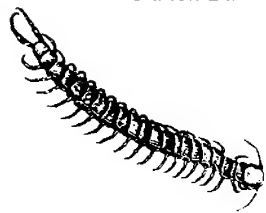
Mundel's (1981) map depicting the distribution of eastern North American lithobiomorphs shows the genus *Taiyubius* as occurring in Wisconsin and Michigan, but I know of no records for any *Taiyubius* species from either state. *Taiyubius* is a western genus, with its few species occurring west of the Rockies. Mundel's (1981) map appears to be based on records of *T. harrietae* (Chamberlin 1909), which is really a synonym of *Lithobius melanops* Newport (see Eason 1977).

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LITERATURE CITED

- Auerbach, S.I. 1951a. A key to the centipedes of the Chicago area. *Bull. Chicago Acad. Sci.* 9:109-114.
- Auerbach, S.I. 1951b. The centipedes of the Chicago area with special reference to their ecology. *Ecol. Monogr.* 21(1):97-124.
- Bollman, C.H. 1887. Descriptions of fourteen new species of North American myriapods. *Proc. U.S. Natl. Mus.* 10:617-627.
- Bollman, C.H. 1893. The Myriapoda of North America: A list of the Myriapoda of Minnesota. *Bull. U.S. Natl. Mus.* (46):181-185.
- Cahn, A.R. 1915. An ecological survey of the Wingra Springs Region, near Madison, Wisconsin, with special reference to its ornithology. *Bull. Wisconsin Nat. Hist. Soc.* 13(3):123-177.
- Chamberlin, R.V. 1911. The Lithobiomorpha of Wisconsin and neighbouring states. *Canadian Entomol.* 43(3): 98-104.
- Chamberlin, R.V. 1912a. Notes on Geophiloidea from Iowa and some neighbouring states. *Canadian Entomol.* 44(3):65-72.
- Chamberlin, R.V. 1912b. The Henicopidae of America north of Mexico. *Bull. Mus. Comp. Zool.* 57(1):1-36.
- Chamberlin, R.V. 1913. The lithobiid genera *Nampabius*, *Garibius*, *Tidabius*, and *Sigibius*. *Bull. Mus. Comp. Zool.* 57(2):37-104.
- Chamberlin, R.V. 1922. Further studies on North American Lithobiidae. *Bull. Mus. Comp. Zool.* 57(6):257-382.
- Chamberlin, R.V. 1925. The genera *Lithobius*, *Neolithobius*, *Gonibius*, and *Zinapols* in America north of Mexico. *Bull. Mus. Comp. Zool.* 57(8):441-504.
- Chamberlin, R.V. 1944. Chilopods in the collections of Field Museum of Natural History. *Field Mus. Nat. Hist. Zool. Ser.* 28(4): 155-216 + 17 plates.
- Cloudsley-Thompson, J.L. 1958. *Spiders, Scorpions, Centipedes, and Mites: The Ecology and Natural History of Woodlice, "Myriapods" and Arachnids*. Pergamon Press, New York.
- Crabill, R.E., Jr. 1952. A new cavernicolous *Nampabius* with a key to its northeastern North American congeners (Chilopoda: Lithobiidae). *Entomol. News* 63(8):203-206.
- Crabill, R.E., Jr. 1954. A conspectus of the northeastern North American species of *Geophilus* (Chilopoda, Geophilomorpha, Geophilidae). *Proc. Entomol. Soc. Washington* 56(4):172-188.
- Crabill, R.E., Jr. 1955. A preliminary report on the Chilopoda of Missouri. *Entomol. News* 66(2):36-41.
- Crabill, R.E., Jr. 1958. On a collection of centipedes from Wisconsin (Chilopoda). *Entomol. News* 69(4):93-99.
- Crabill, R.E., Jr. 1960. A new American genus of cryptopid centipedes, with an annotated key to the scolopendromorph genera from America north of Mexico. *Proc. U.S. Natl. Mus.* 3(3422):1-15.
- Crabill, R.E., Jr. and M.A. Lorenzo. 1957. On the identity of the Gunthorp types, part II, and some notes on plectrotaxic criteria (Chilopoda: Lithobiomorpha: Lithobiidae). *Canadian Entomol.* 89(9):428-432.
- Eason, E.H. 1977. On *Lithobius melanops* Newport (Chilopoda: Lithobiomorpha) in North America. *Entomol. Monthly Mag.* 112:(1340-1343):65-66.
- Gunthorp, H. 1913. Annotated list of the Diplopoda and Chilopoda, with a key to the Myriapoda of Kansas. *Kansas Univ. Sci. Bull.* 7(6):161-182.
- Hoffman, R.L. 1995. The centipeds (Chilopoda) of Virginia: A first list. *Banisteria* (5):20-32.
- Holmquist, A.M. 1928. Notes on the life history and habits of the mound-building ant, *Formica ulkei* Emery. *Ecol.* 9(1):70-87.
- Johnson, B.M. 1952. The centipeds and millipeds of Michigan. Ph.D. Thesis. Univ. Michigan, Ann Arbor.
- Kevan, D.K. McE. 1983. A preliminary survey of known and potentially Canadian and Alaskan centipedes (Chilopoda). *Canadian J. Zool.* 61(12):2938-2955.
- Kevan, D.K. McE. and G.G.E. Scudder. 1989. Illustrated keys to the families of terrestrial arthropods of Canada. I. Myriapods (millipedes, centipedes, etc.). *Biol. Surv. Canada Taxon. Ser.* No. 1
- Lee, R.E., Jr. 1980. Summer microhabitat distribution of some centipedes in a deciduous and coniferous community of central Ohio (Chilopoda). *Entomol. News* 91(1):1-6.
- Levi, H.W. and L.R. Levi. 1987. *Spiders and Their Kin*. Golden Press, New York.
- Lewis, J.G.E. 1981. *The Biology of Centipedes*. Cambridge Univ. Press, Cambridge.
- Matthews, D.C. 1935. The Chilopoda of Wisconsin. Ph.D. Thesis. Univ. Wisconsin, Madison.
- Mundel, P. 1981. A review of the lithobiomorph centipedes of Mexico. Ph.D. Thesis. Univ. Wisconsin, Madison.
- Mundel, P. 1991. Chilopoda, Pp. 819-833 In D.L. Dindal (ed). *Soil Biology Guide*. John Wiley & Sons, New York.
- Snider, R.M. 1991. Updated species lists and distribution records for the Diplopoda and Chilopoda of Michigan. *Michigan Acad.* 24(1):177-194.
- Summers, G. 1979. An illustrated key to the Chilopoda of the North-Central Region of the United States. *J. Kansas Entomol. Soc.* 52(4):690-700.
- Summers, G., J.A. Beatty and N. Magnuson. 1980. A checklist of Illinois centipedes (Chilopoda). *Great Lakes Entomol.* 13(4): 241-257.
- Summers, G. and G.W. Uetz. 1979. Microhabitats of woodland centipedes in a streamside forest. *American Midl. Nat.* 102(2): 346-352.
- Williams, S.R. and R.A. Hefner. 1928. Millipedes and centipedes of Ohio. *Bull. Ohio Biol. Surv.* 4(38):93-147.
- Watermolen, D.J. 1996. The centipede *Lithobius celer* (Chilopoda: Lithobiidae) in Wisconsin. Univ. Wisconsin-Milwaukee *Field Station Bull.* 29(2):11-13.



These little creatures make but a mean figure in the ranks of animals, yet have been terrible in their exploits, particularly in driving people out of their country.

- C. Owens, in *Essay towards a Natural History of Serpents*, 1752